

Shifting from data to evidence for decision making

Educators have been looking in all the wrong places for answers to school improvement.

By Steve Benjamin



Consider this joke and how it relates to schools examining data:

A gentleman exited a restaurant late at night, and as he walked toward his vehicle, he saw a fellow hunched over beneath a street lamp, obviously searching for something.

“Can I help you?” he asked.

“Why, yeah, I’m looking for my keys.”

They searched together for a while without luck.

“Where did you drop your keys?” the Good Samaritan asked.

“Over there in the alley,” he replied.

“Then why are we looking here beneath this lamp?”

“The light’s better,” he said.

When it comes to data-based decision making, many educators are also looking in the wrong place. That’s one reason why this potentially powerful practice has too often underdelivered. Many schools rush headlong into analyzing data without considering if the data they’re reviewing is worth the effort, if other data might provide greater insight to opportunities for improvement, if shining the light elsewhere might prove more beneficial. School leaders haven’t ensured careful consideration of this question: *Which data are most important for our improvement efforts?*

Educators have gotten little useful guidance about the data they should be collecting and which data would deliver the biggest bang for our buck. I say educators need some pretty simple and straightforward guidance:

- Review the evidence regarding powerful indicators/predictors of student achievement and well-being before collecting and analyzing performance data. What does the research reveal to be the top one or two factors that bear on math facts fluency, reading comprehension,

propensity to drop out, success in algebra, success in college, etc.

- Then, let the evidence guide you.

This process, which I call Evidence-Based Decision Making, will increase the odds that education improvement efforts will be successful. Data can lead to knowledge, knowledge to right action, and action to improvement (Figure 1), but the entire process turns on the quality of data that educators are examining.

FIG. 1.

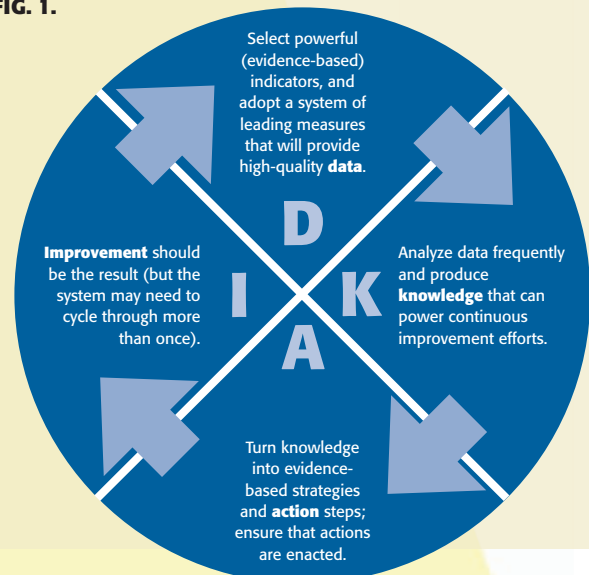


Table 1 provides a few examples of very important data — the type that should most concern teachers, principals, and students; the type that can truly fuel their improvement efforts.

STEVE BENJAMIN (qualityconsultants@comcast.net) consults with teachers and administrators for the benefit of student learning.

TABLE 1.

What the evidence says

Key indicator/type	Evidence
Academic Phonemic awareness	<p>"Recent longitudinal studies of reading acquisition have demonstrated that the acquisition of phonemic awareness is highly predictive of success in learning to read — in particular, in predicting success in learning to decode. In fact, phonemic awareness abilities in kindergarten (or in that age range) appear to be the best single predictor of successful reading acquisition" (IRA, 1998, p. 3).</p> <p>Correlational studies have identified phonemic awareness and letter knowledge as the two best school-entry predictors of how well children will learn to read during their first two years in school. Discriminating units of language (i.e., words, segments, phonemes) are linked to successful reading. Results of the meta-analysis showed that teaching children to manipulate the sounds in language helps them learn to read (NICHHD, 2000, pp. 1, 5).</p>
Academic Phonological awareness levels	<p>"Children who quickly come to understand the relationships between letters and phonemes, and who learn to use this information as an aid to identifying words in print, almost invariably become better readers than children who have difficulty acquiring these skills" (Torgesen & Mathes, 1998).</p> <p>An essential part of the [reading] process for beginners involves learning the alphabetic system, that is, letter-sound correspondences and spelling patterns, and learning how to apply this knowledge in their reading (NICHHD, 2000, p. 89).</p> <p>Kindergarten "screening batteries should include assessments for phonological awareness, letter and sound knowledge, print concepts, and vocabulary" (National Center on Response to Intervention, 2013, p. 1).</p> <p>"For 1st graders, the ability to decode individual words accounts for most of the variance in 1st graders' reading comprehension" (SEDL, 2013).</p>
Academic Word identification fluency	<p>"Research has shown accurate isolated word reading is a significant indicator of 1st-grade reading competence . . . fluency with reading isolated words has been shown to be useful for monitoring 1st graders' emerging reading . . . evidence suggests [word identification fluency] has stronger predictive validity than [nonsense word fluency]" (Zumeta et al., 2012, para. 4).</p> <p>"For better predictions about which 1st graders might have reading difficulties, screening batteries should assess word identification skills" (National Center on Response to Intervention, 2013, p. 1).</p>
Academic An early understanding (preschool, primary grades) of math concepts (number sense) is the most powerful predictor of later school success	<p>A review of research by Duncan et al. (2007) revealed that early math skills predict future math achievement as well as future reading achievement, but attaining early language/reading skills (vocabulary, knowing letters, and phonetics) was second in predicting later achievement.</p> <p>"Number sense performance in kindergarten, as well as number sense growth from the start of kindergarten through the middle of 1st grade, accounted for 66% of the variance in 1st-grade math achievement" (Jordan et al., 2007, p. 42).</p>
Academic Oral reading fluency and word knowledge appear to be moderately/strongly correlated with success in reading achievement	<p>"A wealth of research supports the value of oral reading fluency as an indicator of overall reading competence and its utility for helping teachers plan better instruction and effect superior student outcomes" (Fuchs et al., 2001, p. 252).</p> <p>Kamil et al. (2008) identify vocabulary (word knowledge) as one of the most important factors contributing to literacy.</p> <p>Vocabulary (word meaning) contributes as much as 70% to 80% toward comprehension (Bromley, 2007).</p> <p>A correlation of .76 was found between oral reading fluency and performance on the Ohio Grade 7 Reading Achievement Test. One hundred percent of students who read 150 wpm passed; 88% of those reading 100 wpm passed (Hunley, Davies, & Miller, 2013, p. 6).</p>
Academic Math computation fluency	<p>By the end of grade 2, students should be able to fluently add and subtract within 100 and by grade 4 to multiply a whole number of up to four digits by a one-digit whole number; multiply two, two-digit numbers; and find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors (NGA & CCSSO, 2010).</p> <p>See Crawford (n.d.) for a review of research that suggests fluency/automaticity expectations should be set at about 1-1.5 seconds per problem.</p>

<p>Academic Fractions and division fluency is a strong predictor of algebra success in each grade where these standards are taught and used</p>	<p>"Analyses of large, nationally representative, longitudinal data sets from the U.S. and the U.K. revealed that elementary school students' knowledge of fractions and division uniquely predicts those students' knowledge of algebra and overall mathematics achievement in high school, five or six years later, even after statistically controlling for other types of mathematical knowledge, general intellectual ability, working memory, and family income and education" (Siegler et al., 2012, p. 691).</p>
<p>Academic Student success on formative assessments of essential standards (important in all grades)</p>	<p>Effective schools research and importance of frequent formative assessment: See Lezotte and Pepperl, 1999 (reteaching); Stiggins, 2002 (assessment for learning); Ainsworth, 2003, and Wiggins & McTighe, 2005 (enduring learning, essential standards).</p> <p>Schools can expect 25 percentile points gains when formative data are used to reteach essential standards to mastery (Lezotte & Pepperl, 1999).</p> <p>Teacher knowledge of student scores on formative assessments has been associated with a 26 percentile point gain in achievement (Marzano, 2009).</p>
<p>Academic Student ability to write persuasively</p>	<p>"A recent study sponsored by the Association of American Colleges and Universities found that argumentative literacy may be the most essential skill students need to succeed in college. The study's recurring theme is that students abandon college chiefly because K-12 education does not prepare them to think, read, and write argumentatively" (Schmoker, 2007, p. 65; Conley, 2003).</p>
<p>Academic/social Degree to which students believe in their own efficacy, their ability to learn and improve (their grit)</p>	<p>Research appears to suggest that by grades 4-5 (or thereabouts), many students have judged school to be a place that values ability more than effort (Ames, 1992; Anderman & Maehr, 1994, for example) and that classroom and school practices related to grading, recognition, types of goal orientation, and grouping patterns "contribute to many of the motivational problems which occur during adolescence" (Anderman & Maehr, 1994, p. 290).</p> <p>"Self-efficacy has been found to have an impact on academic performance. Furthermore, the studies reviewed also indicated that it [self-efficacy] can be improved, making this a worthy area of further research and investment" (Rosen et al., 2010, p. 110; Duckworth & Eskreis-Winkler, 2013).</p> <p>Students tracking their own progress results (on average) in a 32 percentile point gain (Marzano, 2009).</p>
<p>Academic/social Failing grades, poor attendance and behavior, and disengagement linked with dropping out</p>	<p>The key indicators that researchers have identified as indicative of who is most likely to drop out are poor grades in core subjects, low attendance, failure to be promoted, and disengagement in the classroom, including behavioral problems (Kennelly & Monrad, 2007, p. 1).</p> <p>Unexcused absences at any grade are highly predictive of eventual high school failure (Balfanz, 2009).</p> <p>"The graduation rate drops 20-35 percentage points after five unexcused absences at any grade between 6th and 10th. Earning one or more F's in core courses in 9th grade . . . is a very strong predictor of dropping out. However, F's in middle school are just as dangerous and predictive. Earning one core course F in any grade (6th to 10th) reduces the chances of graduating; earning two or more almost eliminates those chances" (Celio, 2011, p. 11-12).</p> <p>"Mild but sustained misbehavior appears to have an independent effect on graduation odds. In other words, not paying attention in class, acting out, and not getting along with teachers in sustained fashion signal disengagement" (Balfanz, 2009, p. 4).</p>
<p>Academic (college- or career-ready) Combined SAT score of 1650 and AP scores of 3 or higher</p>	<p>Students who scored well (earned 3 or better) on one or more AP exams were more likely to graduate from college in five years or less compared to non-AP students, and there appeared to be benefits (although smaller) from engaging in AP classes and taking the exams, even if students did not score well (Dougherty, Mellor, & Jian, 2006).</p> <p>Scoring 1,650 or higher on the SAT is one of the Seven Keys to College and Career Readiness — a series of academic benchmarks that indicate a student is on the path to success in postsecondary education and the workplace. (Montgomery County Maryland Public Schools, 2012).</p>
<p>Safety Maintaining safe and well-managed, orderly environments</p>	<p>Students who report feeling safe at school are more likely to have higher GPAs; 87% of those who strongly agree that they feel safe plan to go college, compared to only 69% of those who do not strongly agree that they feel safe (California Safe Schools Coalition, 2013).</p> <p>"In the effective school, there is an orderly, purposeful, businesslike atmosphere free from the threat of physical harm. The school climate is not oppressive and is conducive to teaching and learning" (Lezotte, 1991, p. 2).</p>

<p>Social Getting connected to the right people/ensuring that each student has at least one adult with whom he/she connects</p>	<p>Students (grades 4-9) who were in strong school-based mentoring relationships showed improvements in overall academic performance and in specific subjects (science, written and oral language), quality of classwork, number of assignments turned in (homework and in-class assignments), and serious school infractions (principal's office visits, fighting, and suspensions). They also reported improvements in scholastic efficacy (feeling more competent academically) and skipping school (Herrera et al., 2007).</p> <p>Evidence suggests that secure elementary-level teacher-student relationships predict greater growth in math and reading ability, greater academic motivation, higher scores on achievement tests, more positive attitudes toward school, and fewer retentions or special education referrals. In secondary-level studies, positive attachment contributes to academic motivation and improved classroom behavior. Students who feel that their teacher cares about them are more motivated, pay attention in class, and earn higher grades. Conversely, poor teacher-student relationships are often associated with children not valuing the subject (math). Youth who report strong relationships with teachers are less likely to use drugs and alcohol, attempt suicide, engage in violence, or become sexually active at an early age (Bergin & Bergin, 2009, p. 152-153 for their review of research).</p>
<p>Social/behavioral Developing high social/emotional intelligence (all grades)</p>	<p>"SEL [social-emotional learning] programs yielded significant positive effects on targeted social-emotional competencies and attitudes about self, others, and school. They also enhanced students' behavioral adjustment in the form of increased prosocial behaviors and reduced conduct and internalizing problems, and improved academic performance on achievement tests and grades" (Durlak et al., 2011, p. 417).</p>
<p>Social/academic Extracurricular participation</p>	<p>Massoni (2011), in a review of the research, identified a number of positive relationships with extracurricular participation: improved grades and behavior, positive attitudes toward school, enhanced self-esteem, school completion for both boys and girls, and social, problem-solving and organizational skills.</p> <p>Research suggests that participation in extracurricular activities may increase students' sense of engagement to their school and decrease the likelihood of school failure and dropping out and may lead to consistent attendance, academic achievement, and plans for education beyond high school (NCES, 1995).</p>
<p>Social/academic Service learning (all grades)</p>	<p>"Reviews of K-12 service learning research include close to 70 studies, most of which have found positive impacts on participating students' academic, civic, personal, social, ethical, and vocational development" (Furco & Root, 2010, p. 16).</p> <p>"Research demonstrates that high-quality service learning improves academic performance and school engagement. Students who are more civically engaged perform better in reading, mathematics, history, and science, and are more apt to complete high school" (National Youth Leadership Council, 2010 — see resource for additional benefits).</p>

Conclusion

Using evidence effectively requires that educators become smarter about the relative importance and value of various data (based on the research), selecting high-quality measures, providing meaningful time for teachers to collaborate regarding their data, translating knowledge into strategies for improvement, using action research techniques to determine if strategies deliver continuous improvement, and linking all of this with professional development, evaluation, reward, and recognition. But everything hinges on the rightness of the data under review. Paying proper attention to this core element will help us look in the right place for the keys to improvement in student learning.

References

- Ainsworth, L. (2003). *Power standards: Identifying the standards that matter most*. Englewood, CO: Lead + Learn Press.
- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, 84 (3), 261-271.
- Anderman, E.M. & Maehr, M.L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research*, 64 (2), 287-309.
- Balfanz, R. (2009). *Putting middle grades students on the graduation path: A policy and practice brief*. Westerville, OH: National Middle School Association.
- Bergin, C. & Bergin, D. (2009). Attachment in the classroom. *Educational Psychology Review*, 21, 141-170.
- Bromley, K. (2007). Nine things every teacher should know about words and vocabulary instruction. *Journal of Adolescent and Adult Literacy*, 50 (7), 528-537.
- California Safe Schools Coalition. (2013). *Safe schools research brief #7: School safety and academic achievement*. San Francisco, CA: Author. www.casafeschools.org/FactSheet7final.pdf
- Celio, M.B. (2011). Risk/success in Seattle middle and high schools: A briefing for the Seattle City Council. www.seattle.gov/neighborhoods/education/documents/MBC_LPC_Briefing2010r.pdf
- Conley, D.T. (2003). *Understanding university success*. Eugene, OR: University of Oregon, Center for Educational Policy Research.
- Crawford, D. (n.d.). The third stage of learning math facts: Developing automaticity. Baltimore, MD: Author. www.rocketmath.com/uploads/Math_Facts_Research.pdf
- Dougherty, C., Mellor, L., & Jian, S. (2006). *The relationship*

between Advanced Placement and college graduation. Iowa City, IA: National Center for Education Accountability. <http://broadprize.org/symposium/2006BroadSymposiumRelationshipBetweenAPandCollegeGrad.pdf>

Duckworth, A.L. & Eskreis-Winkler, L. (2013, April). True grit. *Observer*, 2 (4). www.psychologicalscience.org/index.php/publications/observer/2013/april-13/true-grit.html

Duncan, G.J., Dowsett, C.J., Claessens, A., Magnuson, K., Huston, A.C., Klebanov, P., Pagani, L.S., Feinstein, L., Engel, M., Brooks-Gunn, J., Sexton, H., Duckworth, K., & Japel, C. (2007). School readiness and later achievement. *Developmental Psychology*, 43 (6), 1428-1446.

Durlak, J.A., Weissberg, R.P., Dymnicki, A.B., Taylor, R.D., & Schellinger, K.B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, 82 (1), 405-432. Also see research housed at: www.casel.org/library/2014/1/29/meta-analysis-of-school-based-universal-interventions

Fuchs, L.S., Fuchs, D., Hosp, M.K., & Jenkins, J.R. (2001). Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis. *Scientific Studies of Reading*, 5 (3), 239-256.

Furco, A. & Root, S. (2010). Research demonstrates the value of service learning. *Phi Delta Kappan*, 91 (5), 16-20.

Herrera, C., Grossman, J.B., Kauh, T.J., Feldman, A.F., McMaken, J., & Jucovy, L.Z. (2007). *Making a difference in schools: The Big Brothers Big Sisters school-based mentoring impact study*. Philadelphia, PA: Public/Private Ventures. www.bigsister.org/bigsister/file/Making%20a%20Difference%20in%20Schools.pdf

Hunley, S.A., Davies, S.C., & Miller, C.R. (2013). The relationship between curriculum-based measures in oral reading fluency and high-stakes tests for 7th-grade students. *Research in Middle Level Education*, 36 (5), 1-8.

International Reading Association. (IRA). (1998). *Phonemic awareness and the teaching of reading: A position statement from the board of directors*. Newark, DE: Author.

Jordan, N.C., Kaplan, D., Locuniak, M.N., & Ramineni, C. (2007). Predicting 1st-grade math achievement from number sense trajectories. *Learning Disabilities Research & Practice*, 22 (1), 36-46.

Kamil, M.L., Borman, G.D., Dole, J., Kral, C.C., Salinger, T., & Torgesen, J. (2008). *Improving adolescent literacy: Effective classroom and intervention practices: A practice guide* (NCEE #2008-4027). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. <http://ies.ed.gov/ncee/wwc>

Kennelly, L. & Monrad, M. (2007). Approaches to dropout prevention: Heeding early warning signs with appropriate interventions. Washington, DC: National High School Center at the American Institutes for Research. www.betterhighschools.org/pubs/usergd_dr.asp

Lezotte, L.W. (1991). *Correlates of effective schools: The first and second generation*. Okemos, MI: Effective Schools Products. www.effectiveschools.com/images/stories/escorrelates.pdf

Lezotte, L.W. & Pepperl, J.A.C. (1999). *The effective schools process: A proven path to learning for all*. Okemos, MI: Effective Schools Products.

Marzano, R.J. (December 2009/January 2010). The art and science of teaching/when students track their progress, *Educational Leadership*, 67 (4), 86-88.

Massoni, E. (2011). Positive effects of extracurricular activities on students. *ESSAI*: 9, 27. <http://dc.cod.edu/cgi/viewcontent.cgi?article=1370&context=essai>

Montgomery County Public Schools. (2012, September). MCPS class of 2012 earns record-setting results on SAT. www.montgomeryschoolsmd.org/press/index.aspx?id=3231&page=showrelease

National Center for Education Statistics (NCES). (1995). *Extracurricular participation and student engagement*. Washington, DC: U.S. Department of Education, Institute of Education Sciences, NCES. <http://nces.ed.gov/pubs95/web/95741.asp>

National Center on Response to Intervention. (2013, January). *Screening briefs series-Brief #3: Predicting students at risk for reading and mathematics difficulties*. Washington, DC: U.S. Department of Education, Office of Special Education Programs, National Center on Response to Intervention. <http://www.rti4success.org/sites/default/files/RTI%20Screening%20Brief3-Predicting%20Students.pdf>

National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). *Common core state standards*. Washington, DC: Authors.

National Institute of Child Health and Human Development (NICHD). (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (NIH Publication No. 00-4769). Washington, DC: U.S. Government Printing Office.

National Youth Leadership Council. (2010). *Service-learning and academic achievement research summary*. St. Paul, MN: Author. www.nylc.org/sites/nylc.org/files/SLResearchSummary.pdf

Rosen, J.A., Glennie, E.J., Dalton, B.W., Lennon, J.M., & Bozick, R.N. (2010). *Noncognitive skills in the classroom: New perspectives on educational research*. RTI Press publication No. BK-0004-1009. Research Triangle Park, NC: RTI International.

Schmoker, M. (2007). Reading, writing, and thinking for all. *Educational Leadership*, 64 (7), 63-66.

Siegler, R.S., Duncan, G.J., Davis-Kean, P.E., Duckworth, K., Claessens, A., Engel, M., Susperreguy, M.I., & Chen, M. (2012). Early predictors of high school mathematics achievement. *Psychological Science*, 23 (7), 691-697.

SEDL. (2013). *Reading resources/research evidence*. Austin, TX: Author. www.sedl.org/reading/framework/research.html

Stiggins, R.J. (2002). Assessment crisis: The absence of assessment for learning. *Phi Delta Kappan*, 83 (10), 758-765.

Torgesen, J.K. & Mathes, P.G. (1998). *What every teacher should know about phonological awareness*. Tallahassee, FL: Florida Department of Education. www.fldoe.org/ese/pdf/phon9872.pdf

Wiggins, G. & McTighe, J. (2005). *Understanding by design*. Alexandria, VA: ASCD.

Zumeta, R.O., Compton, D.L., & Fuchs, L.S. (2012). Using word identification fluency to monitor 1st-grade reading development. *Exceptional Child*, 78 (2), 201-220.